



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

In re application of: BAILEY

Application No.: 09/536,347

Filed: March 27, 2000

Title: METHOD AND APPARATUS FOR
PLASMA FORMING INNER MAGNETIC
BUCKET TO CONTROL A VOLUME OF A
PLASMA

Attorney Docket No.:
LAM1P126/P0562

Examiner: ALEJANDRO MULERO,
Luz L.

Group: 1763

Confirmation No.: 3591

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first-class mail on December 8, 2005 in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signed: _____

Sue Funchess
Sue Funchess

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a Notice of Appeal.

The review is requested for the reasons stated on the attached sheets.

Remarks begin on page 2 of this paper.

REMARKS

Examiner Failed to Show Teachings for Several Claim Limitations and Sufficient Motivation to Modify such Teachings

The Examiner rejected claims 2, 5-7, 12, 27-28, 30-31, and 33-34 under 35 U.S.C. 103(a) as being unpatentable over Hershkowitz et al. (U.S. Patent 5,302,205). It would not be obvious to combine the apparatus of FIG. 5 of Hershkowitz with the magnets of FIG. 3 of Hershkowitz to obtain the invention as recited in claim 2 with an azimuthally symmetric field. The Examiner stated that it would have been obvious to modify the apparatus of FIG. 5 of Hershkowitz so as to dispose the plurality of magnetic elements extending substantially from a first end of the process chamber to a chuck because this is an alternative way to generate the magnetic field and enhance the plasma in the processing chamber. Pertinent arguments were presented in Applicant's responses.

A declaration by Andrew D. Bailey III was submitted with the Request for Continued Examination on December 17, 2004. This declaration supports why the invention would not be made obvious by Hershkowitz. The declaration on page 2 points out that the purpose of the device of Hershkowitz is to confine secondary electrons, which requires magnets at the top and bottom and that the apparatus of Fig. 5 of Hershkowitz uses hoops of magnets 14. In Fig. 3 of Hershkowitz, the hoops are turned sideways to form the rectangular hoops of magnets, as shown in Fig. 3 of Hershkowitz. Such hoops turned sideways would not provide the claimed azimuthally symmetric radial gradient. The declaration on page 2 supports this by stating that the 'vertical' magnets in Fig. 3 of Hershkowitz are actually seen by one skilled in the art as hoops of magnets with their magnetic axes pointing 'into and out of' the proposed chamber volume. In addition, the second paragraph of page 2 of the declaration states that "our arrangement has symmetry lacking in Hershkowitz designs." Hence, Hershkowitz does not provide the azimuthally symmetric radial gradient, as recited in claim 2.

The declaration further states that the inventor had to convince others of the advantages of the claimed invention over Hershkowitz, because these advantages were not obvious. This skepticism by experts is further evidence that the invention was not obvious in view of Hershkowitz according to MPEP 716.05.

In the second paragraph of page 3 of the office action mailed September 13, 2005, the Examiner stated that the magnets of Hershkowitz have the claimed magnetic structure so that an

azimuthally symmetric radial gradient will be produced by the magnetic field. Vertical magnets alone do not necessarily provide an azimuthally symmetric radial gradient. In addition to the magnets extending along the length of the process chamber, the spacing between the magnets and magnetic poles of the magnets must be placed in a manner to provide an azimuthally symmetric radial gradient. The Examiner failed to point out anything in Hershkowitz that teaches proper spacing of the vertical magnets and the orientation of the magnetic poles to provide an azimuthally symmetric radial gradient. For at least these reasons, claim 2 is not made obvious by Hershkowitz.

The Examiner rejected claims 9 and 13-14 under 35 U.S.C. 103 (a) as being unpatentable over Hershkowitz as applied to claims 2, 5-7, 12, 27-28, 30-31, and 33-34 above and further in view of Collins et al., EPO 0,892,422 or Taira et al. (U.S. Patent 6,153,977).

The Examiner rejected claims 10-11 and 15 under 35 U.S.C. 103 (a) as being unpatentable over Hershkowitz and further in view of Grunenfelder (U.S. Patent 5,399,253) or Barankova et al. (WO 99/27758).

The Examiner rejected claims 32 and 35-36 under 35 U.S.C. 103 (a) as being unpatentable over Hershkowitz and further in view of Collins et al. (U.S. Patent 6,077,384).

Claims 5-7, 9-15, 27-28, and 30-36 each depend either directly or indirectly from independent claim 2, and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to independent claim 2. Additionally, these dependent claims require additional elements that when taken in the context of the claimed invention, further patentably distinguish the art of record.

For example, claims 9 and 14 further recite that the magnetic elements are individually contained within sleeves. Claims 9 and 14 recite that each sleeve contains only a single magnetic element. The Examiner stated that Collins et al. discloses a single permanent magnet 80 contained within a sleeve 2010. The sleeve 2010 of Collins forms part of the outer chamber wall, as shown in FIG. 27. Because of this, Collins does not allow the magnetic elements to be spaced apart from the walls so that gas from the gas source is able to surround the magnetic elements and go into spaces between the wall and the magnetic elements. Nothing in Hershkowitz or Collins et al. teaches magnets within an individual sleeve where the magnetic elements are spaced apart from the walls so that gas from the gas source is able to surround the magnetic elements and go into spaces between the wall and the magnetic elements.

Taira, in col. 4, lines 15 to 62, teaches that if a plurality of magnetic elements 5 and 5' are used, then all magnetic elements are placed in the same sleeve, not individually contained within sleeves. It is only when one permanent magnet is used, as shown in fig. 4, that the single permanent magnet is individually contained in a sleeve. The teaching of when only one magnet is used it is placed in an individual sleeve, does not make obvious a plurality of magnetic elements where each magnetic element is in an individual sleeve. In addition, Taira does not disclose sleeves (plural). Therefore, it would not be obvious under the cited references to use both a plurality of magnetic elements where the magnetic elements are spaced apart from the walls so that gas from the gas source is able to surround the magnetic elements and go into spaces between the wall and the magnetic elements and have each magnetic element individually contained within sleeves as recited in claims 9 and 14.

In addition, claim 32 recites a dielectric window at the top of the substantially cylindrical shape. The Examiner stated it would be obvious to use the dielectric windows of Collins et al. U.S. 6,077,384 in the device of Hershkowitz to obtain the device as recited in claim 32. As mentioned above, since the device of Hershkowitz is for confining secondary electrons, Hershkowitz places magnets across the top of the plasma chamber. Such magnets would interfere with the transmission of power through the dielectric window. As supported by the declaration to remove the magnets across the top of the plasma chamber would render the device of Hershkowitz unsatisfactory for the purpose of containing secondary electrons, and thus under MPEP 2143.01 V is an improper motivation to modify the references. Therefore, it would not be obvious to combine the dielectric window of Collins et al, in the apparatus of Hershkowitz.

Similarly, claims 35-36 recite a coil adjacent to the first end of the plurality of magnetic elements. The magnets of Hershkowitz across the first ends of the magnetic elements would interfere with transmission of power from the coil into the chamber. Therefore, it would not be obvious to combine the coil of Collins et al, in the apparatus of Hershkowitz.

In addition, regarding claim 34, which further recites that the ends of the magnetic elements are open, the Examiner stated that Fig. 3 of Hershkowitz teaches that the ends of the magnetic elements are open. FIG. 3 does not show that the magnets that form an axially symmetric magnetic field form a magnet free opening so that magnets do not extend across the first ends or second ends of the plurality of magnetic elements. Instead, FIG.3 shows that magnets extend between the ends of the magnetic elements to form the magnet hoops discussed above. As supported by the declaration to remove the magnets across the top of the plasma

chamber would render the device of Hershkowitz unsatisfactory for the purpose of containing secondary electrons, and thus under MPEP 2143.01 V is an improper motivation to modify the references. For at least these reasons, claims 5-7, 9-15, 27-28, and 30-36 are not anticipated or made obvious by the cited references.

In view of the foregoing, it is respectfully submitted that the rejections of all pending claims should be withdrawn.

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

A handwritten signature in black ink, appearing to read "Michael Lee", with a stylized flourish at the end.

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